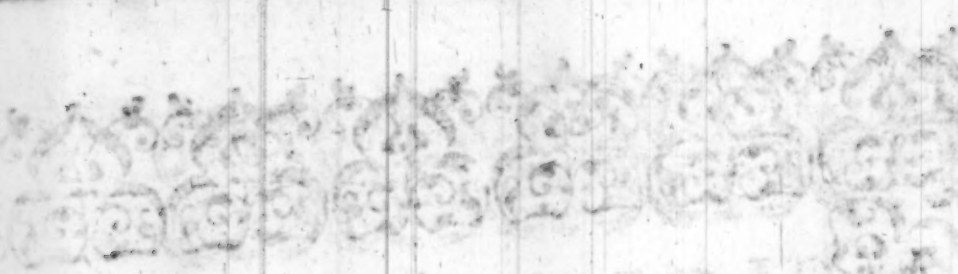


A  
perfect and easie Trea-  
tise of the vse of the cælestiall  
Globe: written aswell for an Intro-  
duction of such as bee yet vnskilfull in  
the studie of Astronomie : as the  
practise of our Countrymen, which  
bee exercised in the Art of Nauiga-  
tion. Compiled by *Charles Turnbull*:  
And set out with as much plain-  
nes as the Author could: to  
the end it might of e-  
uery man be vn-  
derstood.

*Psalms. xix.*

The heauens declare the glorie of God, and the fir-  
mament sheweth the worke of his handes . Day  
vnto day vttereth the same, and night vnto night  
teacheth knowledge.

*¶ Imprinted at London for Sy-  
mon Waterfon.*



# THE HISTORY OF THE

REIGN OF KING CHARLES THE FIRST

BY SAMUEL JOHNSON

IN THREE VOLUMES

LONDON: Printed by J. DODD, in Pall-mall, 1764.

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# INSIGNISSIMO

VIRO, AC OMNI VIR-

tutum genere clarissimo Magistro

Henrico Noclo, Carolus Turn-

bullus salutem ac foelicitatem

perpetuam com-

precatur.



*V*M antiquissimorum scripto-  
rum singularem industriam in  
studijs Mathematicis iam an-  
te serius, accuratiusque cogno-  
uerim: & recentium quorun-  
dam deprauatam lectionem summa cura,  
summaque diligentia viderim & observaue-  
rim: ne infestus error damnum inferret gra-  
uius: citraui (vir insignissime) ea facilius ex-  
plicare, quae si fideliter discantur, omnis er-  
roris tollent difficultatem. Eorum verò te pa-  
tronum esse volui, ut meo exemplo ad eadem  
vota multos inuitem, tanquam indicem te, in  
florētissimo hoc regno non solum tanti nego-  
tij virum celeberrimum: sed omnium regia-  
rum virtutum laudumque patronum. Ita-

A.ij.

que

## EPISTOLA.

que minusculum opus hoc *Astronomicum*,  
qualecunque sit, (quod scio quam sit indi-  
gnum) tibi dedico: ut qui impostertum non  
solum observationes astronomicas elaboratas  
magis, minusque usitatas: (sive sint theoricæ  
sive horalogicæ) sed opticas quoque & quæ  
sunt geometriæ communis præcepta, (ut tem-  
pus postulat) sis recepturus. Quibus ut es spi-  
ritus nobilissimi: ita mirificè quoque delecta-  
ris. Vnum hoc interim precibus etiam at-  
que etiam obsecrans: ut qua huma-  
nitate erga me semper usus es,

(cum maxime possis:)

eadem iam indies

confirmata

magis

(libentissime quoque

velis, patrocini-

nari.

**Valc.**





## To the Reader.



Men which are

more desirous of publique Fame and Renowne, then studious of cōmon profit: with great curiositie set a

glasse vpo such things, as being discovered, would shew dismebred & mishapen. (As for my selfe I seeke no higher dignitie, then to be reported to set forth a trueth: and therefore without any wrested eloquence, I make bold to offer the vse of the Globe, to the exquisite vewe of your curious eyes: (though farre inferiour as I suspect to some mens expectation) to the end such grosse enormities might bee amended, as often times in diuers haue bene discovered. Who for want of right conceat of things by them attempted: haue in the ayer built such fortresses, as haue without assalts wounded their louing enemies. But happely

A.iii.

such



## To the Reader.

Such men wil now retire, and arme them  
selues better against the next assault, lest  
they be like to the dogs in the capitall  
of *Rome* : which were placed to the end,  
that if by night spoylers should ariue,  
they might sound a warning. For, true  
it is, that by night these barke out false  
Allaromes at their enemies : but if by  
day, they barke likewise at friends : I  
hope ye wil iudge them worthy to haue  
their legs broken. which things I leaue  
to your gentle interpretation. Nothing  
misdoubting, but if in this tract either  
any thing bee escaped contrarie to my  
will : or omitted not satisfying your ex-  
pectation: ye wil equally suffer the same.  
For if ye receaue the fruites of my labor  
and care of your commoditie, I require  
no more. Wherefore my trauaile I  
bequeath to your discreet  
consideration, and  
your selues  
to the  
protection of almighty  
God.

Farewell.



## DEFINITIONS

to be præmised neces-

sarie for the vnderstan-  
ding of the Globe.



**T**He Sphere or Globe,  
is a perfect round &  
sollide bodie, contain-  
ed vnder one su-  
perficie or face; in whose middle is  
a point, from which point all lines  
that are drawne to the superficies  
and face of the same: are equall  
the one to the other.

The Center of the Sphere, is the  
middle point of the same.

The Axe of the Sphere, is a  
A.iiij. right

## Definitions.

right line passing from one side of the same, (by his Center) to the contrary side; about which line the Sphere is caried: but the line it self standeth still.

The Poles of the Sphere, be the endes of his Axe.

The Pole of any Circle, is a point without the compasse of the same: (and yet is equally distant from all points, of the circuit or borders of the Circle whose Pole it is:) & from which the same Circle is drawne.

OF





# OF THE NAME

of the Sphære, and his di-  
*uers and sundrie kindes of di-*  
uisions : together with the  
motion of ech one  
in his kinde.



HE NAME OF  
the Sphære , is taken  
either generally or par-  
ticularly . Generally,  
and so it is said to con-  
taine all perfect round  
bodies , whether they  
be solide or not : whether contained vnder  
one onely Superficies or moe. And so may  
euery Dybe be called a Sphære. But if wee  
take the worde Sphæra , in his particular  
and proper signification: then nothing is a  
Sphære : but a perfect round bodie being  
solide, contained vnder one, &c. as the for-  
mer definition declared . This Sphære is  
divided

## The vse of the Globe.

diuided either according to his substance  
or according to certaine properties and af-  
fections which he is capable of.

According to his substance he is diui-  
ded into two parts: the one Elementall,  
the other Æthereall. The Elementall, con-  
taineth the lower Elements, Fire, Ayre,  
Water and Earth: and is subiect to altera-  
tions, by reason of their effectual working.  
The Æthereall, compasseth in round, the  
Elementall part, in his hollownesse, and is  
lightsome by nature, and vchangeable:  
and containeth ten Sphæres. The first and  
highest from the earth, being called the first  
moueable, containeth in his hollownesse al  
the other: and by his natural motion is mo-  
ued directly from the East to the West,  
and so to East againe, in the space of 24. ho-  
urs continually, and carrieth about with  
him by violence, al the other Sphæres. The  
next vnder this is the ninth Sphære, called  
the Christall heauen, and by his naturall  
motion is carried from West toward East,  
but very slowly, in many yeares passing but  
one degree: and this motion hath caused  
the Starres to alter their Longitudes. The  
third Sphære is the Firmament or Sphære  
of



## The vse of the Globe.

of the fixed Starres: whose motion by nature is vpon two little Circles: the one being described about the head of Aries, and the other of Libra: which motion is called the motion of Trepidation. The other seauen Sphaeres be of the seauen Planets: the highest of Saturne, which moueth by nature from West toward East, and that in 30. yeares one perfect reuolution. The next of Iupiter, moouing frō West to East by nature, and that in twelue yeares. The other of Mars, making his reuolutiō from West toward East in two yeares. Under Mars is the Sunne, moouing by nature from West toward East, making one perfect reuolution in 365. daies and 6. howers almost. Under the Sunne is Venus, and then Mercurie, moouing from West to East about the same time as the Sunne. The last is the Moone, making one perfect reuolution from West toward East in 27. daies. 7. howers. 43'. 7". yet all these are carried by violence of the first moueable from East to West, as is before saide.

OF



# OF THE CIRCLES of the Sphære of

Heauen, and of their names, and how they be made.



Astronomers to the end they might shewe the motions of Heauen, and the straunge and wonderful conclusions of the Cœlestiall bodies: haue imagined certaine Circles in the bodie of the first Sphære or first moouable, and principally ten: whereof some be greater Circles of the Sphære, so called because the Center of these Circles is also the Center of Heauen: & euery such Circle diuideth the whole Sphære into two æquall parts. Of this sort be six: the Equinoctiall, Zodiack, Horizon, Meridian, and two Colures. Some be lesser Circles of the Sphære so called, because they haue not the Center of the world for their Center, neither diuide the whole Sphære æqually. Of this kinde be fower, the Tropicke of Cancer, the Tropicke of Capricorne, the Articke and Antarcticke.

The

## The vse of the Globe.

**T**he Equinoctiall, called the æquator or girdle of Heauen, is a great Circle of the Sphere, diuiding the Sphere into two æqual parts, and is æqually distant from each Pole of the worlde. And tooke his name of the æquator, either because it is æqually in the middle of Heauen, as Euclide saith in his Opticks: or for that the Sunne, coming to this Circle, maketh the day and night æquall. & it is diuided in 360. æquall parts, which parts are called degrees. His Arc is the Arc of the world, and Poles, the Poles of the world.

**T**he Zodiack is a great Circle of the Sphere, which crosseth the Equinoctiall in two points, the one being the head of Aries, the other of Libra, and swaruech from him in all other points, leaning toward each Pole of the world in ½ point of his greatest swaruing, 23. degrees, 30. minutes. This Zodiack is of breadth 12. degrees, and of length, that is to say, in compass 360. degrees, and according to his length, is diuided into 12. æqual parts, which are called the 12. signes. Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius and Pisces.



## The vse of the Globe.

Pisces. And ech signe contayneth of length 30. degrees. in the middle bredth of the Zodiack, we imagine a Circle to passe, which we call the Ecliptick Circle or line: For that that when the Sunne and Moone bee both vnder this line in a Diameter: then the Moone is Eclipsed. Under this Circle the Sunne mooueth dayly (without declining any waies) the quantity of one degree very neere in ech day. the rest of the Planets are found some times on one side the Ecliptick, & some time on the other. This Zodiack taketh his name of a greeke word signifying a liuing creature: or as the Latens will, is called Signifer, for that that it beareth the 12. Signes. the Arc of the Zodiack and the Ecliptick, is all one, being a line diuers from the arc of the world, and the Poles bee two points alwayes so much distant from the Poles of the world: as the greatest declination of the Ecliptick cometh vnto.

A Colure doth generally signifie any Circle passing by the Poles of the worlde, and hath his name of his vnperfect shewing himselfe in the motion of heauen. But now by the name of Colures, we vnderstand two  
great



## The vse of the Globe.

great Circles, the one going frō the Poles of the worlde by the points where the Aequinoctiall and Zodiack cut them selues (which be called the Aequinoctiall points) and is called the Aequinoctiall Colure. The other passeth from the Poles of the worlde, by those points of the Ecliptick which swarue most of all others from the Aequinoctiall line (which points are called the Solsticiall points) and this is called the Solsticiall Colure. And here be you to know that these foure greater Circles which we haue defined: be still the same through the whole worlde, and are sayd to be moueable Circles: for so much as in the motion of heauen, they be also mooued, of which, some are moueable perfectly: as the Aequinoctiall and Zodiack, (for they in the going about of heauen, doe ascend by little and little, till the whole Circle haue gone ouer the Horison) some vnperfectly moueable, as the two Colures, which neuer shew the whole Circle in any crooked Sphere. the other two greater Circles which followe, be called fixed, for that they neuer mooue by the motion of heauen. But they be changeable in euery Region.

The

## The vse of the Globe.

The Horizon is a greate Circle diuiding the halfe of the Heauen which we see, from the halfe which we see not, and is called in Latine Finitor, because it endeth our sight. The Horizon maketh fower principal points, East, West, North, and South. His Arc is a line imagined to fall from the point of heauen, which is directly ouer our head where we be, downe to the ground like a plumme line, and his Poles be the endes of that line, called the Verticall point, and point opposite to the Verticall.

The Meridian is also a great Circle, passing from the Poles of the world by our Verticall point, cutting the Horizon in the North and South points. his Arc is a line going from the East point of the Horizon to the West, and his Poles be the same points, and these two Circles doe alwayes chaunge, & are diuers in euery Region: for so much as the Verticall point of euery Region is diuers, by the which the Meridian of necessitie must passe, and is the Pole also of the Horizon.

Of

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# OF THE LESSER Circles of the Sphære,

and their names, and of  
their making.

**T**He lesse Circles of the Sphære  
in number be fewer. The Tropa-  
ricke of Cancer, the Tropicke  
of Capricorne, and the two Ar-  
tickes. The Tropicke of Cancer, is a lesse  
Circle of the Sphære, which is aually di-  
stant from the Equinoctial, lying betwixt  
the Equinoctiall and the North Pole, and  
touching the Ecliptick in the beginning of  
Cancer. This Circle is described by the  
bodie of the Sunne in the longest day of  
Summer, at which time the Sunne is en-  
tered the solstitiall point, or beginning of  
Câcer. & is called the Tropick, of a Greeke  
word, which signifieth a returning: because  
the Sunne being brought to this point, fal-  
leth in his noone height, and returneth a-  
gaine.

The Tropicke of Capricorne, is a like  
Circle betwixt the Equator & the South  
pole, and is described by the Sunne in the  
shortest day of Winter, at which time the  
B. J. Sunne



## The vse of the Globe.

Sunne is in y<sup>e</sup> beginning of Capricorne whereof it is called the Tropick of Capricorne.

The Articke Circle is a lesse Circle of the Sphære, described by the Northerne Pole of the Ecliptick. *Proclus* saith it is described by the foremost foote of the great beare, and thereof taketh his name.

The Antarticke is a like Circle described by the South Pole of the Ecliptick, & is called Antartick of the Greeke worde, which signifieth Opposition, because it is opposite to the other.

## Of the vse of the Circles of the Sphære or Globle.

**T**HE most principall cause why Artificers inuented the Equinoctiall, was first, because it is the measure of the first Heauen, by a conuenient, perpetual and equal swiftnesse. Secondly, it measureth and limittech the time of rising of the Signes, as also the length of the Artificiall daies, and times of the Equinoctials, with declinations and right ascensions of Starres, together with Longitudes of Regions.

## The vse of the Globe.

gions. Lastly, for the crection of the twelue  
houses of Heauen. In like maner, the Zo-  
diack serueth for Latitudes & Longitudes  
of Starres: for distinction of the times of  
the yeare: for the motions of all the Pla-  
nets and effects of the same. Not unlike be  
the vses of the Colures and Meridian, ech  
shewing the greatest declination of the E-  
cliptick: but especially the Meridia, which  
giueth as well al declinations of Starres,  
their noone height, and distinguisheth  
the daies and nightes into two equal parts,  
and serueth for the Horizon of the right  
Sphere. It beginneth likewise and endeth  
all Longitudes of Regions, and sheweth  
Latitudes and Elevations of the Pole: It  
helpeth to divide the 12. houses. In like  
maner, sundrie and diuersa be the vses of the  
Horizon: As in seperating the hidden part  
of Heauen, from that which is seene, and  
sheweth the place of rising and setting of a-  
ny Starre: how farre from East or West,  
with his height. All which points are re-  
spected of Astronomers, as the Sphere is  
secondarily diuided: that is to say, as he is a  
right, or a crooked Sphere, which bee his  
properties and affections ment in the diui-

B.ij.

tion



## The vse of the Globe.

Now afore specified . By a right Sphære is meant such a kinde of position of Heauen: as that neither Pole bee raised aboue ground, but that ech lye in the face of the earth. And such a kinde of position haue they which dwell in Bersera, and the Islands of Molucca, or such like. Contrariwise, it is sayd to bee a crooked Sphære, when any one of the Poles is raised aboue ground. Such a Sphære haue we at Oxford, and London: and generally all, which dwell not vnder the line. All which thinges for our better conceate, are shewed to the eye in the materiall Globe, whose names and diuisions appere at the first vewe: two things only being wanted. First, that the mechanicall or materiall Globe which representeth the first mooueable: beareth in him the fixed Starres, (not because the Starres bee in the first mooueable) but because their motion is so litle in their own Sphæres in many yeares, that they may seeme not to haue mooued at all in a mans his age from their places vnder which they be of y first mooueable: therefore they may bee supposed to stand in it. Secondly, the Globe representeth the Starres to vs in his conuexitie, which



## The vse of the Globe.

which appeare in Heauen in the contras-  
tie. For that our eye is not in the Globe  
but without. Furthermore in the Globe,  
besides the afozenamed Circles, bee found  
three others of brasse: the one being a per-  
fect Circle of a litle quantitie, placed about  
the Pole which is elevated: & is called the  
hower Circle, whose stile is called the In-  
dex. An other is a thinne rule of brasse, re-  
presenting one quarter of a whole Circle,  
called the quadrant of Altitude, and is al-  
waie to be fixed (when ye vse the Globe) on  
the middle of the halfe of your Meridian,  
which is aboue the Horizon: that is to say,  
90. degrees aboue the Horizon. The third  
and last is a great halfe Circle lying at the  
Horizon, seruing aswell for the erection  
of the scheme of Heauen, as any Circle of  
position. All which things being aduisedly  
considered of, ye may procede in the vse of  
the Globe: As followeth.

B. iij. How

# HOW THE Globe is to be placed, readie for his vse and practise.

**T**he placing of the Globe ought to be such, that the Horizon of the Globe may stand parallele or leuied to the true Horizon: and the Meridian of the Globe stand in the Superficies of the true Meridian of Heauen, and the Poles of the Globe and his Arc, answere exactly to the Poles and Arc of Heauen. Now to the leuying of the Horizon: there ought to bee at your Globe a hanging plummet, and for the Meridian, a Needle touched of the lode stone, and touching the rectifying of the Poles and Arc of the Globe, the eleuation of the Pole of heauen is first to be knowen. the meanes to performe and accomplish the same, being such as followe.

*Propositio. I.*

To finde a Meridian line in any  
place appoynted.

**S**Et vp on your Horizon or some plaine  
leuied boarde, a Gnomon of any reaso-  
nable

## The vse of the Globe.

nable length then, (at such time as the same shineth, describe from the top of your Gnomon a Circle by the tippe of his shadowe, and make a marke in the Circle where the shadowe ended, at your obseruation (which must be before noone.) Then marke in the afternoone at what time the ende of the shadowe returneth into the same Circle againe, and make a marke at his point of falling, so shall ye haue a portion of the sayde Circle inclosed betwixt the two points: If then ye diuide this portion into two equal parts, and drawe a line from this middle point, by the point in which the Gnomon standeth, it shalbe a Meridian line.

### *Propositio. 2.*

To take the height of  
any Starre.

FRom the point of Heauen, which is directly ouer our heads (being called the Verticall point, or Zenith:) are imagined diuers Circles to fall by euery degree and minute of the Horizon: all which Circles are called Verticals, & serue for the height of Starres, for so much as the altitude of



## The vse of the Globe.

Sunne or starre is the portion of the V  
ticall Circle, inclosed betwixt the Cen-  
ter of the Sunne or Starre (in the time of  
his obseruation) and the Horizon, which  
height is thus found.

Take your Astrolabe, and let him hang  
freely by his ring, then turne vp his Dio-  
ptral so long, that ye see the Starre (whose  
height yee seeke) thowoe his sights: for  
then, howe many degrees and minutes  
are inclosed betwixt the Dioptrall and the  
line of your Astrolabe, which is parallele  
to the Horizon: so many hath that Starre  
of height. as the seauenty day of Ianuarie.  
Anno. 1585. vnder the Meridian of Ox-  
ford, at 9. of the clocke I sought the height  
of the Sunne. taking then my Astrolabe,  
and hanging him towarde the Sunne, and  
raising his Dioptrall till I espyed the  
Sunne, I found betwixt the Dioptral and  
the line representing the Horizon seauen  
degrees, and 16. minutes, so much was the  
height of the Sunne at that time.

*Prope-*

## The vse of the Globe.

### *Propositio. 3.*

To take the altitude of the Pole in  
in any place or countrey.

**T**he altitude of the pole is the portion of  
the Meridian Circle inclosed betwixt the  
Pole and the Horizon, and is thus found.  
Find a Meridian line, and drawe him in  
the Horizon by the first proposition: then  
take the height of any fixed Starre which  
settech not ( and that at the fore part of the  
night ) at such time as he is pointed vppon  
your Meridian line, by the second propo-  
sition. Again the next morning, or any other  
morning take the height of the same starre  
at such time as hee is pointed with your  
Meridian line: then subtract the lesse alti-  
tude from the greater, and diuide the diffe-  
rence into two equall partes. Lastly, adde  
halfe the difference to the lesse altitude, so  
the whole number made giueth the altitude  
of the Pole. As at Oxford I tooke the height  
of a starre in the fore part of a night in win-  
ter, being the tenth of December. 1584.  
at what time he was pointed with my Me-  
ridian, and found his height. 55. degrees.  
59. minutes. Again the next morning I  
tooke



## The vse of the Globe.

tooke his height, and found it 47. degrees 41. minutes. This lesse altitude I suboucted from the greater 55. degrees. 59. minutes, and the difference was 8. degrees. 18. minutes, which being parted, had 4. for his halfe, and 9. minutes. This halfe added to 47. degrees. 41. min. (the lesse altitude) giueth 51. degrees. 50. minut. for the true eleuation of the Pole at Oxford.

### *Propositio. 4.*

To rectifie the Globe perfectly  
for to be vsed.

**K** Now first the eleuation of the Pole of Heauen, for the place where yee vse the Globe, by the third proposition, then erect the Pole of the Globe so many degrees aboue his Horizon, as the Pole of heauen is eleuated. Againe leuell the Horizon of your Globe by his hanging plummet, lastly turne his Meridian to the South by helpe of his Neede, and put his Quadrant of altitude vppon the 90. degree from his Horizon: for then the Meridian answereth to the Meridian of heauen. Arc to arc, and Pole to Pole as is required. But this way



## The vse of the Globe.

way of setting him South, albeit it be of antiquitie: yet hath it imperfection by reason of the variatio of the needle, but of that ye shall heare more hereafter.

### *Propositio.*

To finde the place of the Sunne  
at any tyme.

**B**y this place, is understoode the degree of the Ecliptick line, in which he is, and this place is thus found. In the Horizon of your Globe be set, the windes, the signes, and moneths with their daies. find therefore the day of your moneth in which ye would haue the place of the Sunne in the Horizon of the globe. For looke what signe and degree of signe is right against the day, the same is the place of the Sunne. As on the twelfth day of December: Anno. 1584. I sought the place of the Sunne. this day being had in the Horizon, I found the first degree of Capricorne, 32. minutes to answer against it, and therefore that was then the place of the Sunne.

*Propo.*

## The vse of the Globe.

### *Propositio. 6.*

To finde the declination of any point  
of the Ecliptick or of the Sunne,  
at any tyme.

**T**he declination of any point of the Ecliptick, Sunne, or any Starre, is the portion of the Meridian Circle, inclosed betwixt the Equinoctiall and the sayd point, Sunne, or starre, and is found thus. Turne the point whose Declination wee seeke, to the Meridian of the Globe, and there see how many degrees and minutes there be of your Meridian inclosed betwixt the sayd point and the Equinoctiall. For so much is the Declination, so hath the Sunne in the 5. of Aries 2. degrees declination. And the 7. of Taurus 13. degrees, 52. minutes, and this declination is called Northern, when the point is of the North side the Equinoctiall, and Southerne if of the South side. Here must ye also know, that two points of the Ecliptick want declination, and are the two Equinoctials. Two haue greater declination then any other, and be the two Solstitials, of the rest foure haue like declination.

*Propo-*

## The vse of the Globe.

### *Propositio. 7.*

To finde the right ascension of the  
Sunne, or any point of the  
Ecliptick line.

**T**HE right ascension of any Starre,  
Sunne, or any point of the Ecliptick,  
is the portion of the  $\mathcal{A}$ quinoctiall Circle  
from the head of Aries, (where the  $\mathcal{A}$ qui-  
noctiall taketh his beginning) and that  
point or degree of the same, which meeteth  
with the said Starre, Sunne, or Ecliptick  
point, under the Meridian Circle in a croo-  
ked Sphære: being numbred orderly in the  
 $\mathcal{A}$ quinoctiall, and is thus found. turne the  
Starre, Sunne, or any point whose ascen-  
tion ye looke, under the Meridian of the  
Globe, and see then what portion of the  $\mathcal{A}$ -  
quator is from the head of Aries to that  
point of the  $\mathcal{A}$ quator which standeth then  
under the Meridian: for the same portion,  
is the right ascension of the Starre, Sun,  
or point looked for. So do I finde the right  
ascension of Bootes a Starre, to be 209.  
degrees. 1. minut. And the right ascension  
of the Sunne whē he is in the first of Tau-  
rus, to be 27. degrees. 54. minuts. And the  
right



## The vse of the Globe.

right ascension of the first of Sagitarie, to be 237. degrees. 48. minutes.

### *Propositio. 8.*

To finde the crooked ascension of the Sunne, Starre, or any point of the Ecliptick.

**T**HE crooked ascension of the Sunne, is that Ark of the æquator which is inclosed betwixt the beginning of the æquator, and the point of the same which cometh vp with the Sunne in a crooked Sphære, it is found thus. Take the Sunne Starre, or point, whose crooked ascension ye desire: and put him to the East side of the Horizon till it touch: Then marke what part of the æquator is inclosed betwixt the beginning of it, and the point now in the Horizon, for so much is the crooked ascension of the Sunne, Starre, or point. So doe I finde the crooked ascension of the Sunne in the first of Taurus, to be the 12. degrees. 48. minutes. All this being in the Elevation 52. degree. 0. minute.

*Propo-*

## The vse of the Globe

### Propositio. 9.

To find the difference of ascention,  
or increase of the day.

**T**HE Sunne being in one and the selfe  
same point of the Ecliptick (except in  
the æquinoctiall intersections) hath one  
degree of the æquator that cometh vp  
with him aboue the Horizon in any croo-  
ked Sphære, and an other, (not the same)  
that cometh vp with him in a right Sphære.  
And therefore the portion of the æquator,  
betwixt the point of the said, that cometh  
vp with the Sunne in the right Sphære:  
and the point rising with the same in the  
crooked Sphære, is called the difference of  
ascention. As in a right Sphære the Sunne  
being in the first of Taurus, there riseth  
with him, the 27. degree. 54. minut of the  
æquinoctiall. (Which point also meeteth  
him vnder  $\gamma$  Meridiã in a crooked Sphære:  
for that  $\gamma$  Meridiã of any crooked Sphære,  
sheweth the same that the Horizon doth in  
the right Sphære.) but in the crooked  
Sphære, where the Pole is eleuated 52.  
degrees, there riseth with the Sunne the  
same day, the 12. degree. 48. minut of the  
æqua-



## The vse of the Globe.

Equator. Subtracting now the lesse from the greater, the difference is 15. degrees. 6. minuts, and is called the difference of ascension. And because the Artificiall day of the crooked Sphere, is longer or shorter then the Equinoctiall day by twice this difference: therefore the difference of ascension is called also the increase of the day. And this difference is thus found. Find the right ascension of the Sunne by the 7. proposition: and againe finde his crooked ascension by the 9. proposition: then subduct the lesse from the greater, for the remainder is the difference of ascension.

### *Propositio. 10.*

To finde the length of the Artificiall day in any Region  
or Countrie.

**F**Inde out the difference of ascension of the place of the Sunne by the 9. proposition, and double the same: then conuert it all into howeres and parts of howeres, allowing for one hower 15. degrees, and for a halfe 7. degrees. 30. minuts, &c. This time which comineth of the difference of ascen-  
tion



## The vse of the Globe.

Then adde to 12. howers (if the place of the Sunne bee any degree betwixt Aries and Libra: or subduct it fro 12. if he be betwixt Libra and Aries,) for the number made or left, is the length of the day. As the Sunne being in the first of Taurus, his difference of ascension is 15. degrees, 6. minuts: this dubble and conuerted into time, maketh 2. howers and 12. Equinoctial minuts. And because Taurus is a Northerne Signe, ye must ad this difference to 12. howers, so do ye make 14. howers and 12. Equinoctiall minuts, for the length of that whole day.

### *Propositio. 11.*

To finde the hower of the Sunne rising, or of his setting.

**K** Nowe the length of the Artificiall day by the 10. proposition: and take halfe of the same day, for that sheweth the hower of Sunne setting. But if ye reckon so much from noone forward, it giueth Sunne rise. As the Sunne being in the first of Taurus, the day is 14. howers and 12. minuts. The halfe is 7. howers and 6. minuts. I say then the Sunne setteth after 7. of the clocke, 6. minuts,

### The vse of the Globe.

minuts. Againe, thus much taken from noone forward, sheweth the Sunne to rise before 5. of the clocke, 6. minuts.

#### *Propositio. 12.*

An other way to finde the same more mechanically.

**F**Inde the place of the Sunne by the 5. proposition, and turne the saide place directly under the Meridian: then put the Index of the hower Circle precisely on 12. of the clocke. Lastly, turne the saide place of the Sunne to the East side of the Horizon: for when he is there, then shall the Index shewe the time of the Sunne rising. And contrariwise, putting the place of the Sun to the West, it sheweth his setting.

#### *Propositio. 13.*

To finde how farre the Sunne riseth or setteth from the true East or West point any day.

**F**irst finde the place of the Sunne by the 5. proposition: then turne the same place to the East side of the Horizon til he touch the

## The vse of the Globe.

the same, for then the number of degrees in the Horizon, (inclosed betwixt þ true East point and the place of the Sunne,) shewe how farr he riseth and setteth from the true East: And this portion of the Horizon is called his bredth of rising: and is called Northern bredth if the Sunne rise beyond þ East point toward þ North, & Southern if contrary. Likewise are ye to knowe, that of the Ecliptick two points Aries and Libra haue no bredth of rising. Two points also as Cancer and Capricorn haue greater then any other: and of the rest fower points haue the like.

### *Propositio. 14.*

To rectifie the Index of the hower Circle euery day as he ought.

**F**Inde the place of the Sunne euery day in which ye vse the Index, by the 5. proposition, and put the said place vnder the Meridian: this being done, the put the Index on 12. of the clocke, for after ward in the motion of the Globe he will goe true as he ought.

*C.ij.*

*Propo-*



## The vse of the Globe.

*Propositio. 15.*

To finde the noone height of the  
Sunne for any day to come,  
or gone in any place  
whose eleuation is  
knownen.

**T**he height of the Sunne, is the portion  
of the verticall Circle inclosed betwixt  
the Center of the Sunne and the Hori-  
zon. But for as much as at noone the Me-  
ridian, and the Verticall of the Sunne bee  
all one Circle: therefore his noone height  
is the portion of the Meridian betwixt the  
Center of the Sunne and the Horizon.  
this height is thus to be knownen. Find the  
place of the Sunne for the day proposed,  
and turne the same place vnder the Me-  
ridian, for then the portion of the Meridian  
betwixt the sayd place and the Horizon is  
his noone height. Thus found I the height  
of the Sunne at noone in Oxford, whose  
Pole is rayled 51. degrees. 50. min. on the  
2. day of May to be 59. degrees. 47. mi. and  
on the twelfth of June, to be 61. degrees.  
41. minutes.

*Propo-*

## The vse of the Globe.

### *Propositio. 16.*

To find the deprefſion of the  
Sunne at midnight.

**A**S the Meridian altitude is the portion of the Meridian from the Center of him, to the Horizon when hee is aboue the earth: ſo is his deprefſion the part of the Meridian betwixt the Center and the Horizon when he is vnder ground, and may thus bee knowne. Finde the place of the Sunne, and put it to the Meridian vnder the Horizon: for then the portion of the Meridian betwixt it & the Horizon, ſheweth his deprefſion. So find I the deprefſion of the Sūne, at Oxford (his place being the firſt of Taurus) to be 27. degrees. 40. min. but his place being the firſt of Scorpius, to be 50. degrees. 0. min.

### *Propositio. 17.*

To find what height the Sunne ſhall  
haue at any certaine hower  
of any artificiall day.

**T**Ake the place of the ſunne by the 5. proposition: & rectifie the Index by the 14. pro. then turne the Globe, till the Index of  
C.iii. the

## The vse of the Globe.

the lower circle be on the lower, for whom  
ye desire the height of the Sunne, and stop-  
ping the Globe there, put the quadrant of  
altitude to the place of the Sunne, for his  
portion betwixt the place of the Sunne &  
the Horizon, giveth his height. So find I  
the height of the Sunne at Oxford, at 9. of  
the clocke the 7. day of March. to be 24. de-  
grees. 25. min. and at one of the clocke the  
same day, to be 34. degrees. 51. min.

### *Propositio. 18.*

By any height of the Sunne geuen  
and his place: to find the hower  
of the day.

**L**Et it bee, that either ye take the height  
of the Sunne at some time of the day  
by the second proposition: or that ye haue  
some height of him giuen by supposition,  
and ye would knowe by it what it is of the  
clocke that day at that time. Find there-  
fore the place of the Sunne for that day.  
by the 5. proposition & rectifie the Index by  
the 14. proposition. Lastly put the place of  
the Sunne to the Quadrant of Altitude,  
and mooue them both up and downe, till ye  
allowe



## The vse of the Globe.

allowe him the same height in your Quadrant, as ye found or supposed him in trueth to haue. For then the Index of the hower Circle sheweth what was or is of the clock, as finding the height of the Sunne before Noone on the seauenth of March, at Dr. foxe, to be twentie fower degrees. 25. min. I founde it to haue beene then nine of the clocke.

### *Propositio. 19.*

By the hower knowen, and the height of the Sunne at that hower: together with the Index, rectified as he ought: to find the place of the Sunne at that tyme.

**M**ouue your Globe till his Index stand on the hower which was knowen before. Then fixe the Globe for remoouing: Lastly turne your Quadrant of altitude to the Ecliptick line, and looke what degree of the Ecliptick agreeth in your Quadrant with the height that was before knowen, and that is the place of the Sunne on that day.

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### *Propositio. 20.*

The hower and place of the Sunne being giuen : to find howe farre the Sunne is gone from the true East poynt.

**T**he place of the Sunne being giuen by supposition : rectifie the Index by the 14. proposition : then turne the Globe till the Index shew the hower giuen. This being done, fixe the Globe that he mooue not away, and set the edge of the Quadrant of altitude to the place of the Sunne : and withall marke howe many degrees of the Horizō are inclosed betwixt the true East point, and the edge of the Quadrant, at such time as he stādeth on the place of the sunne : for so much is hee distaunt in the Horizon from true East.

### *Propositio. 21.*

The distance of the Sunne being geuen, from true East, together with his height at the same time, and the height of the Pole for the same region : to finde the true place of the Sunne, at any time.

**T**o the ende wee make not vnnessearie repetitions of the first principles: know this,

## The vse of the Globe.

this, that in all the propositions following, we alwayes suppose before the working, the Globe rightly rectified as is specified in the beginning. For the performance therefore of this practise: first consider diligently in what quarter of the yere ye be in, that is, whether it be betwixt the æquinoctiall of March, and height of Summer: or betwixt height of Summer, and æquinoctial of September. Likewise whether betwixt æquinoctial of September and dept of Winter: or betwixt dept of winter and æquinoctiall of March. For then set the edge of the quadrant of altitude at the true distance of the Sunne from the East: and turne the Globe till that quarter of the Ecliptick come vnder him, which serueth for the quarter of the yere in which ye be: and see what degree of that part of the Ecliptick agreeth with the height proposed: For that is the place of the Sunne at that time.

Note therefore here, that to the Spring (which is from the æquinoctiall of March till the height of Summer) answereth the part of the Zodiack from Aries to Cáncer. To summer which is from the height till the æquinoctiall of September: answereth



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recteth the part from Cancer to Libra. The Autume is guided by the quarter from Libra to Capricorne: and Winter by the signes from Capricorne to Aries.

*Propositio. 22.*

The distance of the Sunne being geuen from true East, and the place of the same: to find the height of the Sunne which he hath at the same time.

**P**Lace the quadrant of altitude at the true distance from East, so shall hee cut the place of the Sunne by the 21. proposition: and therefore the portion of the Quadrant betwixt the place of the Sunne, and the Horizon, is his height.

*Propositio. 23.*

The distance of the Sunne from true East being geuen, and his place: to find the hower of the day.

**F**irst hauing his place: rectifie your Index by the 14. proposition: again setting the Quadrant of altitude on the distance from

## The vse of the Globe.

from true East, reduce the place of  $\gamma$  sunne, till he fall in the edge of the Quadrant, for then the Index doth shewe the hower.

### *Propositio. 24.*

The distance of the Sunne being geuen from true East, and his height, to find the time of his rising.

**T**he distance being giuen, find his place by the 21 proposition: and then rectifie the Index by the 14 proposition: Lastly put the place of the Sunne to the East side of the Horizon: for then the Index will shew the Sunne rising.

### *Propositio. 25.*

The distaunce of the Sunne being giuen from true East, and his height, to finde his Declination.

**T**he distaunce being giuen, his place is found by the 21. proposition: & his place being knowne, giuech his Declination by the 6. proposition: So may wee likewise by the said distaunce (finding his place) finde his right or crooked ascencion, or difference of

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of ascensions, and length of Artificiall  
daies.

*Propositio. 26.*

The declination of the Sunne being  
knowne: to finde the place  
of the Sunne.

**C**ONSIDER first diligently in what quar-  
ter of the yeare ye be in, as was expres-  
sed before: then take that quarter of the E-  
cliptick which answereth to your quarter  
of the yeare: and mooue it still vnder the  
Meridian of your Globe, till ye finde no  
more of the Meridian inclosed betwixt the  
æquator and Ecliptick, then the declina-  
tion that is giuen commeth vnto: for then  
looke what degree of y<sup>e</sup> Ecliptick is vnder  
the Meridian, that is the place of the Sun.  
As the declination of the Sunne in y<sup>e</sup> quar-  
ter of the yeare betwixt the Æquinoctiall  
of March, and height of Sommer was gi-  
uen to bee 11. degrees. 50. minutes. And to  
this quarter of the yeare, answereth the  
quarter of the Ecliptick frō Aries to Can-  
cer. Therefore moouing the said quarter  
vnder the Meridian, I found the first of  
Taurus



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Taurus to aunswere to this declination:  
and therefore that was the place of the  
Sunne.

### *Propositio. 27.*

The declination of the Sunne be-  
ing knowne : to finde the  
day of the Moneth.

**B**y the declination giuen, finde the place  
of the Sunne by the 26. proposition: the  
take the said place in the Horizon of your  
Globe : for looke what day aunswereth a-  
gainst it, that is the day of the Moneth.

### *Propositio. 28.*

The day of the Moneth being knowne,  
to finde the length of the Plane-  
tarie hower.

**T**he Artificiall day is from Sunne rise  
to Sunne set : and the 12. part of this  
day, whether it be longer or shorter then an  
hower by the clocke, is the Planetarie ho-  
wer: and may thus be knowne. The day be-  
ing giuen, finde the length of that day by  
the 10. proposition : and diuide all by 12.  
The

## The vse of the Globe.

The Quotient is the length of a Planetarie or Artificiall hower of that day. As the day being 15. howers by the clocke, I diuide it by 12. the Quotient is one hower and a quarter, and so much is a Planetarie hower of that day.

### *Propositio. 29.*

The day of the Moneth being giuen: to finde the dawning of the day.

**B**y the day knowne, finde the place of the Sunne by the 5. proposition: and then rectifie your Index by the 14. proposition. Again, take the degree of the Ecliptick which is opposite in a Diameter to  $\hat{p}$  place of the Sunne: and mooue him toward the West together with the Quadrant of Altitude, till ye haue 18. degrees of height: for then the Index sheweth the beginning of the dawning or spring of the day.

### *Propositio. 30.*

To finde the length of the whole dawning.

**F**inde the beginning of the dawning by the 29. proposition, and then the Sunne rise

## The vse of the Globe.

rise by the 11. or 12. proposition: for the difference of those times is the whole dayning. And thus farre haue I followed such conclusions, as haue a more orderly coherence: it remaineth now to shewe some others, whose coherence is not so naturall.

### *Propositio. 31.*

An other way to finde the length  
of the Artificiall day  
or night.

**F**inde the time of the Sunne rising for your day proposed by the 12. proposition: then dubble all those howeres and partes of time which be from Sunne rise till noone, for it giueth the Artificiall day. Or if ye number all the howeres and parts from Sunne rise to his setting, it giueth the same.

### *Propositio. 32.*

To finde the hower of the day.

**P**Lace the Globe in the Sunne shine, and rectifie him to his vse by the 4. proposition, then finde the place of the Sunne by the 5. proposition. Againe, rectifie his Index



## The vse of the Globe.

der by the 14. proposition. Lastly, set an needle or pinne directly vp in the place of the Sunne: then turne the Globe vp till the pinne cast no shadowe, for then the Index sheweth what is then of the clocke.

### *Propositio. 33.*

To finde the eleuation of the Pole,  
in any place.

**D**Rawe in the open ayre vpon some table that is leuell, a Meridian line by the 1. proposition, and place the Globe so on it, that his Meridian Circle hang directly ouer it: then hauing the place of the Sunne, set a pinne right vp in it, and put the said place and pinne close to the Meridian circle. Lastly, lift vp the Pole and Meridian Circle, till the pinne cast no shadowe: for then the degrees betwixt the Pole and the Horizō, be the true eleuatiō of that place. But this practise is to bee performed at noone onely or height of the day.

### *Propositio 34.*

An other way to doe the same.

**T**Ake the height of any fixed Starr (whom ye know) by the 2. proposition,  
at

## The vse of the Globe.

at such time as he pointeth with the Meridian line: then take the same Starre on the Globe, and by helpe of your Quadrant or Meridian Circle, cause him to haue the same Altitude in the Globe, and withall to be vnder the Meridian of the Globe: for thē is the Pole at his true Elevation. So did I finde the Pole Starre (making my obseruation at Oxford, the 11. of December 1584.) by the plaine Sphere, to haue 55. degrees. 59. minuts in Altitude, being thē in the Meridian of Heauen: and when I set him at the same in my Globe, I found the Pole elevated there 51. degrees. 50. minuts. And here ye are to knowe, that when soeuer ye haue by any way, the elevation of the Pole in any place: if ye subduct the same elevation from 90. degrees, it shall leaue and shewe the elevation of the æquator in the sayd place. So then the elevation of the æquator at Oxford, is 38. degrees. 10. minuts.

### *Propositio. 35.*

An other way of working the same,  
with more præcisenes.

**F**irst learne by some good Ephemeris  
the precise place of the Sunne at noone  
D.i. in



## The vse of the Globe.

in the day of your obseruation: then againe learne y<sup>e</sup> exact declination of the said place. Lastly, with your Instrumēt take the Meridian height of the Sunne that day: And if the declination bee Northerne, then subduct it from the Meridian Altitude: but if it be Southerne, then ad it to the Meridian Altitude: so shall wee bring forth the Altitude of the æquator: and this Altitude being subducted from 90. degrees, leaueth the Altitude of the Pole: but if the Sunne in the time of obseruation be in the Equinoctiall point, then is the Meridian Altitude, the Altitude also of the æquator, and it subducted from 90. degrees, leaueth the Altitude of the Pole.

### *Propositio. 36.*

To make a Horizontall Diall  
by the Globe.

**A** Horizontall Diall is such a one as is made in a plaine Superficies, and lyeth leuell with the Horizon. For making whereof ye are to consider, that from one Pole of the Globe to the other goe twelue great Circles, called hower Circles, and diuide



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diuide the æquator into 24. æquall partes  
And two of these bee two Colures . Put  
therefore the Solstitiall Colure precisely  
vnder the Meridian of your Globe, (the  
Globe being first perfectly rectified) and  
fixe y<sup>e</sup> Globe so that he cannot mooue. Now  
marke how many degrees of the Horizon  
are inclosed betwixt the Meridian and the  
next lower Circle toward the East (which  
for distinction sake I call the second lower  
Circle) so likewise betwixt the first & third,  
the first & fourth, the first and fifth, the first  
and sixt, the first and seventh: (which is he  
that cutteth in the true East point) and set  
them all downe in tables : then drawe on  
some plaine thing a Circle, and diuide it  
into fower quarters, by drawing two crosse  
lines: Now take the one ende of any of the  
two lines, and terme it the North point, so  
shall his other end be the South point, and  
the endes of the other line East and West.  
Againe, diuide that quarter of this Circle  
which is betwixt the North point and East  
into 90. æquall parts, and let 90. stand at  
the East . So doe by the quarter betwixt  
North and West . Lastly, reckon from the  
North point toward East, so many degrees

## The vse of the Globe.

as your tables shewe to haue bin betwixt the first and second hower line : and from the point where they ende , drawe a line by the Center of the saide Circle : and so doe by all the numbers of your tables : for so shall ye haue your hower lines drawne for a Horizontall Diall . In whose Center must be a stile erected, according to the eleuation of your Pole . But this I leaue obscure, as meaning to set out an ample treatise of Dialling by it selfe.

### *Propositio. 37.*

How the Starres may be knowne  
by the Globe of Heauen.

**R**ectifie your Globe in the open ayre by the 4. proposition, the take the height of any knowne Starre by your Instrument, afterward looke the same Starre on the Globe , and by helpe of your Quadrant of Altitude put the same Starre at his height taken before, and in the same Coast, & then fixe the Globe. Now if ye would knowe any other Starre of Heauen , then take the same Starre his height with your Instrument: lastly, turne your Quadrant of Altitude



## The vse of the Globe.

tude toward the same Coast of the Globe in which the Starre was in: & looke what Starre ye finde in that Coast, to haue that Altitude, the same is he whom ye seeke. The like is to be done by all others.

### *Propositio. 38.*

To finde the Longitude of any fixed Starre.

**T**HE Longitude of a Starre, is the portion of the Ecliptick line, taken from the head of Aries, (according to the order of the Signes) to the point of the Ecliptick, cut by a Circle which passeth frō the Pole of the Ecliptick, by the Center of the sayd Starre: and is thus found. Take the Globe from his Horizon, and take of his Meridian Circle, and fixe the same Circle by some meanes on the Poles of the Zodiack, then turne the Starre whose Longitude ye seeke, vnder the Circle: and reckon all the Signes and parts from the head of Aries, to that point of the Ecliptick which is vnder the Circle with the Starre: for so much is his Longitude. And the same point of the Ecliptick which is so vnder the Circle, shalbe called the place of that Starre. And the Starre is sayd to bee vnder that

D.iii.

Signe,



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Signe, of whom the aforesaid point is a part. The Longitude may also be taken, if ye doe but fixe the Quadrant of Altitude in the Pole of the Ecliptick, and stirre not at all the Meridian Circle.

### *Propositio. 39.*

To finde the Latitude of  
any Starre.

**T**HE Latitude of a Starre, is the portion of the Circle that passeth from the Poles of the Ecliptick line, by the Center of any Starre, which is inclosed betwixt the Ecliptick line and the Center of the Starre, and is found thus. Your Circle standing in the Poles of the Zodiack as before: turne the Starr vnder the said Circle: for then the portion of that Circle betwixt the Starre and the Ecliptick, is his Latitude. And this Latitude is Northern, when the Starre is North from the Ecliptick: and Southerne if contrary.

### *Propositio. 40.*

To finde what Starres be aboue ground  
at any time of the day or night.

**I**f ye would know it in the day time whē the Sunne shinech, then take the height of the Sunne by the 2. proposition: afterward

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ward finde his place by the 5. proposition: lastly, by help of the Quadrant of Altitude, set the Sunne at his owne height & Coast, and then all the Starres aboue the Horizon doe appeare in the Globe. Now if it be in the night, and the Starres appeare, then take the height of some knowne Starre, and place the same Starr at his due height in the Globe, so shall ye see the same.

### *Propositio. 41.*

To doe the same without Sunne, or appearaunce of any Starre.

**Y**E must knowe what it is of the clocke at that time when ye would worke this conclusion: then rectifie the Index by the 14. proposition: Lastly, turne the Globe till the Index come on the same hower as is giuen by the clocke, for then the Starres appeare as they should.

### *Propositio. 42.*

To finde what Starres will passe directly ouer our heads in the motion of the heauen.

**A**fter that the Quadrant of Altitudes is fixed in his due place, as is spoken of before, so that he now doe shewe the Zenith or Verticall point: then meoue about the

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Globe



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Globe, and marke what Starres passe vnder the Zenith in this motion, for those bee such as goe by our heads, & are called sometimes Culminant starres, sometimes Verticall starres, and haue their cheefest vse in Astrologie.

### *Propositio. 43.*

To knowe with what degree of the Ecliptick any Starre riseth, commeth to the Meridian: or setteth.

**M**oue the Globe till the Starre whom ye propose, ascend aboue the Horizon, and then marke the degree of the Ecliptick that riseth with him. Againe mooue him to the Meridian, and marke the degree of the Ecliptick, so doe by him in the West side of the Horizon, and ye shal haue your intent.

### *Propositio. 44.*

To knowe the hower of any Starres rising.

**R**ectifie the Index by the 14. propositio, then turne the Globe til the said Starre (whose time of rising ye desire,) touch the East side of the Horizon: for then the Index giueth his time of rising. And if ye turne him to the Meridian, the Index will shewe his time of comming thither: or if ye  
turne.



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turne him to the West side of the Horizō,  
the Index sheweth his setting.

*Propositio. 45.*

To find in how long time any  
whole signe ariseth.

**R**ectifie the Index by the fowerteenth  
proposition: then put the beginning of  
the signe (whose time of rising ye seeke) to  
the East part of the Horizon: and marke  
what the Index standeth on then: againe,  
put the last degree of the sayde signe to the  
Horizon, and see what the Index sheweth:  
for the differēce of the two times by the In-  
dex, is the time in which that signe riseth.

*Propositio. 46.*

To find in what coast any starre is,  
and how many degrees from  
the *Meridian*.

**F**inde the Starres aboue ground by the  
40. proposition: then the Globe beeing  
fixed: put the Quadrant of altitude to any  
Stare. Then shall the foote of the Qua-  
drant shewe in the Horizon, how farre the  
same Starre is from East, West, North or  
South. But if ye first rectifie your Index  
by the 14. proposition: and then finde the  
starres aboue by the 40. propositiō. Agayn  
at

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at the same time marke where the Index standeth: lastly put any Starre vnder the Meridian, and againe note the standing of the Index: the differēce of those two times shewed by the Index, is the distance of that Starre from the Meridian, in the time of your obseruation.

### *Propositio. 47.*

To find what Starres rise or set any day, Cosmically, Achronically or Helically.

**S**uch starres as bee neare to the sunne in any day, and ascende aboue the Horizon a little before the appearance of the same: are said to ryse helically, and such Starres as set very little after the Sunne, are sayd to set helically. Againe such Starres as ascend together with the Sunne, and such as set at the same time, are sayd to rise and set cosmically. Lastly, such starres as set together with the Sunne: and such as rise at the same time: are sayde to set and rise achronically, and such may bee thus found. Rectifie the Index by the 14. proposition: and turne the place of the Sunne to the East side of the Horizon: for the starres going immediatly before the Sunne, rise helically.

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helically, and those in the Horizon rise cosmically: and they that are in the Horizon in the west, doe set cosmically, and such as immediatly rise after the Sunne, doe sette helically. Lastly turne the Sunne to the West point of the Horizon, and looke what starres touch the Horizon with him, such set achronically: and such as are at the same time rising in the East, rise Achronically.

### *Propositio. 48.*

To knowe the hower of the night,  
at any time by the Starres.

**R**ectifie the Index by the 14. proposition, then againe finde what starres bee aboue ground at the same time, when yee would knowe y<sup>e</sup> hower, by y<sup>e</sup> 40. proposition: for then the Index will shewe the hower.

### *Propositio. 49*

To find the fower Cardinall points  
of heauen at any time of  
day or night.

**T**he fower Cardinall points, bee the fower degrees of the Ecliptick, where of one is in the East rising: an other is in the South or vnder the Meridian, aboue at the same time: the third in the West setting,  
and



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and the fourth vnder the Meridian beneath ground, all at one instant, in the time of any geniture, or motion of any question, and are thus knowen. If yee seeke them in the day (the Sunne shining) then find the starres aboue ground by the 40. proposition: and with all marke the degree of the Ecliptick in the East, so likewise in the South, West and North, for those be then the Cardinall points. Againe, if it be in the night, then find the starres aboue by the same 40. proposition, and the pointes shall likewise appeare. Lastly, if nether the Sunne shine, or starre: then knowe the hower by the clock, and afterward find the starres aboue ground at the sayd hower by the 41. proposition, so shall the pointes be geuen as before.

### *Propositio. 50.*

To find the bignes of the angle, made betwixt the Meridian Circle, and any Circle of position.

**C**ircles of Position bee all such, as are drawen from the North point of any Horizon by the Center of any starre, and so to go to the South point of the same Horizon, to returne to the North againe. And euery one of these Circles doth make some  
with

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with the Meridian, and the sayd angle hath his bignes shewed, by a portion of the fixed Verticall: so that to find the bignes of the angle made betwixt the Meridian and any Circle of position: is to find the portion of the fixed Vertical, inclosed betwixt the Meridian and the said Circle of position. that portion is thus found. Put your quadrant of altitude, to the true East point, then raise by your Brasle halfe Circle as high above the Horizon as yee please: so that it may now represent some circle of position, for then the degrees of the Quadrant of altitude from the Meridian to this circle: be the bignes of the angle made betwixt the Meridian, and the Circle of position. but if your circle of position fall on the West side of the Meridian, then put the Quadrant to the West point, and worke as before.

### *Propositio. 51.*

To find the beginnings and endes of the 12 howses of Heauen.

**C**oncerning the erecting the scheme of heauen, or as we commonly call it the twelue howsen: though sower diuers waies haue bene receaued, touching the howsen, how they ought to bee taken: yet it is not  
our



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Our entent to discourse of that question, but to shewe howe they ought to be erected, according to the most vsuall way, set downe by Regiomontanus, & called reasonable. Therefore first ye are to knowe, that in any Horizon wheresoeuer wee be, wee doe imagine sixe circles to be drawen from the North point of the Horizon to the South of the same, and diuiding the Equinoctiall into 12 equall partes, and the 12. spaces betwixt these circles, are called the twelue howses. (& two of the 6. circles are alwaies the Meridian and Horizon.) in euery one of these howsen is inclosed some portion of the Zodiack, and one portion is greater then an other. so that to erect the twelue howsen, is to find out the portion of the Ecciptick inclosed in ech space, & to do it, we thus proceede. First find out the fower Cardinal points by the 49. proposition, for those be the beginnings of 4. howsen of the twelue: the Cardinall point vnder the Meridian aboue ground, is the beginning of the tenth howse. This done, fixe the Globe, then recken from the degree of the equator (being then vnder the Meridian) 20. degrees toward the East point, & raise vp your masse halfe



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halfe circle to stand on the point of the æquator on which pee left. For looke then what degree of the Ecliptick is cut then by the brasse halfe Circle: the same is the end of the tenth howse, and beginning of the eleuenth. Againe, yet reckon 30. degrees more in the æquator toward the East, and put the brasse halfe circle to it, and the take the degree cut in the Ecliptick, for that is the end of the eleuenth howse, and beginning of the twelfth. Againe the Cardinall point of the East, is the end of the twelfth howse, and beginning of the first howse. Now if in like sort ye goe from the degree of the æquator vnder the Meridian, by ech 30. degree of the same toward the West point, and still obserue the degrees cut in the Ecliptick: pee shall haue the beginnings and ends of the ninth, eighth and seauenth howse. Thus hauing erected sixe howsen, the degrees of the Zodiack which are opposite to these in a Diameter, (one to another) bee the beginnings and ends of the other sixe howsen, which were to be found. And here must pee note, that the first howse beginneth at the East point, and goeth vnder the ground toward the Meridian Circle,

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Circle, the second and the third succede.  
'the fowerth, beginning at the Meridian  
vnder ground comming toward West, the  
fifth and sixth succeed, the seventh begin-  
neth in the West, and goeth aboue ground  
toward the Meridian, the eight and ninth  
succeed. Other conclusions lesse profitable  
I wittingly auoyded: and the more excel-  
lent, deferred to a more conuenient time.

FINIS.



### Errata.

Pa: 3.li: 13.indicem, lege iudicem.

Pa: 23.li: 1.same, lege Sunne.

Pa: 24.li: 1.lege Ver.

Pa: 46.li: 16.till ye, lege till it.





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